



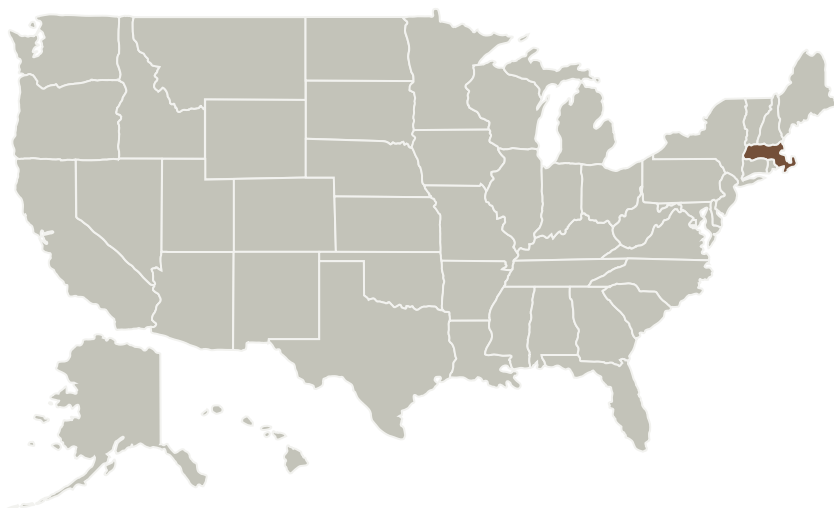
## Project Introduction

With NASA support, MIT has developed a new type of lightweight, high efficiency, high resolution diffraction structure called the critical angle x-ray transmission (CAT) grating. Technology development effort over the last several years has produced a number of promising prototype gratings with diffraction efficiency approaching predicted levels. MIT proposes to develop improved grating fabrication processes and new packaging technology designed to produce flight-quality grating elements with technology readiness progressing from TRL-3 to TRL-5. Proposed grating fabrication process improvements are designed to boost process yield and grating throughput. We also propose to develop technology for bonding grating elements to flight-like metal frames and for attaching frames to prototype grating array structures. Grating elements, frames, fasteners and support plates need to be engineered to survive launch and space conditions and prevent distortion or damage to gratings due to thermal expansion and other forces. We propose to test grating structures with metrology tests such as x-ray diffraction efficiency and UV period mapping, under representative flight conditions, in order to validate progress to advanced TRL nodes.

## Anticipated Benefits

Decadal Survey Missions

## Primary U.S. Work Locations and Key Partners



Advanced Packaging for Critical Angle X-ray Transmission Gratings

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## Organizational Responsibility

### Responsible Mission Directorate:

Science Mission Directorate (SMD)

### Responsible Program:

Strategic Astrophysics Technology



## Primary U.S. Work Locations

Massachusetts

## Project Management

### Program Director:

Mario R Perez

### Program Manager:

Mario R Perez

### Principal Investigator:

Mark Schattenburg

### Co-Investigators:

Ralf Helimann

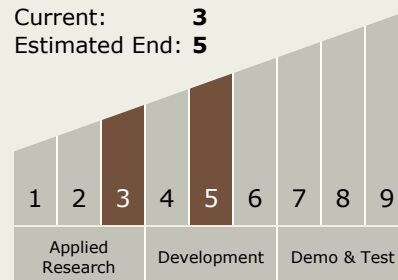
Martin Klingensmith

## Technology Maturity (TRL)

Start: 3

Current: 3

Estimated End: 5



## Technology Areas

### Primary:

- TX08 Sensors and Instruments
  - └ TX08.1 Remote Sensing Instruments/Sensors
    - └ TX08.1.1 Detectors and Focal Planes



## Target Destination

Outside the Solar System